**SECTION 14 92 00**

**PNEUMATIC TUBE SYSTEM**

**PART 1 GENERAL**

**1.1. DESCRIPTION:**

A. Provide all engineering, labor and materials for the complete installation of computer controlled pneumatic tube system.

**1.2. RELATED WORK**

A. Specification Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables.

**1.3. QUALITY ASSURANCE**

A. Refer to Paragraph, Quality Assurance, in Section 23 05 11 – Common Work Results for HVAC.

**1.4. SUBMITTALS**

A. Submit in accordance with Specification Section 01 33 23 – Shop Drawings, Product Data and Samples.

B. Product Data: Manufacturer’s detailed data sheets on each component and description of system.

C. Shop Drawings: Detailed layout of tube routing and components, indicating the following:

1. Equipment locations and dimensioned layouts of major components.
2. Penetrations through floors and required clearances.
3. Location and method of field connection to structure.
4. Tube riser diagram.
5. Electrical power requirements and locations needed.

**1.5. GUARANTY**

A. **In accordance with the General Conditions.**

**PART 2 PRODUCTS**

**2.1. SYSTEM DESCRIPTION**

A. The pneumatic tube system shall be a computer controlled pneumatic tube materials transport system consisting of tubing, stations, diverters, blower packages, carriers and a control center.

B. The PTS shall consist of two stations arranged on 1 zone.

C. The modular design of the PTS components shall permit changes in the number of stations and/or zones as Owner requirements change.

D. If a power failure occurs, the PTS will continue to process carriers under UPS. All in-transit carriers will be processed to their destinations and all pending transactions will be cancelled.

1. If power fails at a blower, diverter or station, the controls will identify that device as unavailable voiding all transactions which involved the affected device.

E. A 115 VAC duplex receptacle and device on/off switch shall be provided at each station, exchanger, and blower package.

F. Each station, diverter, exchanger and blower shall include diagnostic capability at the unit.

**2.2. EQUIPMENT**

A. Line Material:

1. Tubing shall be 6 inch outside diameter, 16 gauge, cold rolled, electric welded steel, flash removed, degreased and hot dip galvanized. (ASTM A787 light comm.)
2. Bends shall be formed of same material on a center line radius of not less than 36 inches. The cross-section shall be free from wrinkles and distortions. No expanded bends shall be allowed in the System.
3. All cut ends shall be square, deburred and mandreled round.
4. Tube and bends to be joined by solid slip or clamp sleeves or expanded end slip joints, sealed to prevent leaks.
5. Tubing shall be supported with suitable hangers and supports as follows:

   a. Minimum every 10 feet of straight tubing.
   b. At every floor of vertical runs
   c. At each end of bends.
   d. At equipment connections.

6. Hangers shall be all-thread, zinc plated rod attached to the building structure. Tear-drop hangers fastened to the rod shall support the tubing.

B. Diverters:

1. Diverters connect one tube to multiple tubes, providing the tubing network for routing to each station.
2. Diverters shall be installed with clamp sleeves and sway braced against motion.
3. Diverters shall be located to allow for complete and clear access to service components.
4. Diverters shall be pneumatically operated and position in 1 second.

5. Diverters shall not rely on sensors for alignment but have a physical position stop.
6. All diverter position sensing and carrier sensing shall be by non-contact sensors.
7. Diverters shall be provided as required with 1 inlet port and multiple outlet ports; 2, 3, 4 or 6.

C. Blower Units:

1. Blower units shall be regenerative type, complete with vibration isolators, cleanout screen boxes and air shifter as required.
2. Blowers shall be located to allow complete and clear access to service components.
3. Zone blower packages:

   a. One blower unit shall be provided per zone.
   b. Zone blower packages shall be designed to be mounted up off floors for easy access to service blower and shifter components.
   c. Zone blowers shall provide vacuum and pressure to the system to maintain nominal carrier speed of approximately 20 fps.
   d. For energy conservation, blowers shall automatically shut down during low use periods.
   e. Air tubing shall be 4 inch outside diameter of the same material as transmission tubing. Air tubing shall be of the same material as transmission tubing. Tubing shall be complete with all necessary tees, elbows and fittings.

D. Stations:

1. Stations shall consist of a self supporting enclosure which includes a send chamber, receive bin, and carrier storage rack.
2. Stations shall be up send and down receive for air cushioned delivery at receive slidegate.
3. All components shall be front accessible and removable easy for repair or replacement.
4. All control units shall be plug-in type for fast replacement and shall be interchangeable with units in other stations.
5. All component position sensing and carrier sensing shall be by non-contact sensors.
6. All visible metal surfaces shall be factory painted powder coat epoxy.
7. The dispatcher shall hold one carrier at a time.
8. Stations shall be capable of dispatching a five pound payload.

E. Carriers and Liners:

1. Sealed carriers:

   a. Provide 4 carriers per station as follows:

      1) Full access side opening or end opening.
      2) Bi-directional.
      3) Replaceable wear bands.

4) Easy open positive closure latches.
5) Capable of carrying: specimens, medications, x-ray film, 1,000 ml IV bags with up to 100 ml's additives.
6) Clear inside dimensions: 4-½ inches diameter by 15-5/8 inches length.

2. Provide half of the carriers with thin carrier liners for cushioning large items.
3. Provide half of the carriers with full carrier liners for cushioning small items.

F. Automatic Central-Control Center:

1. Operation of the System:

a. A solid state memory computer shall control the system. The computer shall perform logic, control, supervisory and alarm functions and provide permanent storage for system operating program. Program memory protection shall be provided during power loss. Interface controls shall transmit operating data to and from stations. Keyboard shall request information and shall simulate operation of components throughout entire system. Printer shall print transactions and failures.

2. Control Program:

a. The control program shall become the property of the user. The control program shall be constructed to allow the user to add, delete, and/or relocate components of the system, onsite, without the need for a new program or programming assistance.

3. Video Display Monitor to display in English language data for the following functions:

a. Failure Location: Zone, central storage lane, station, power unit or transfer unit.
b. Failure Type: Mechanical, electrical or component position.
c. Present Transactions: Station carrier is leaving from and station carrier is going to, backlog per station or zone and carrier in storage lanes.
d. Carrier Distribution: Number of carriers assigned to each station, number of carriers presently at each station.
e. Station sign-off schedule.
f. Failure Action: Locate where carrier is and corrective action to be taken.

g. System History Display: Show all system traffic for the past 24-hour period with totals for stations, zones, and the entire system. This display shall be automatically printed.

4. Keyboard: The keyboard shall be interactive with the video monitor to perform the following functions:

a. Request video monitor displays listed above.
b. Simulate components for trouble shooting. Simulation of all components shall be made to determine the malfunctioning unit.

5. Printer: Printer shall be laser jet with at least 128 MB of random access memory, 1200 dots per inch resolution, and support normal and postscript fonts and drivers. Type face supported shall be True Type fonts. Printer shall support HP PCL 6, HP PCL 5e and Post Script emulation. Printer shall be equipped with 10/100 Base Ethernet card, a serial and parallel port. All Ethernet connectivity cables, power cables and printer drivers shall be provided with the printer. Printer shall be equipped with at least two paper drawers. Each drawer shall have a capacity of at least 600 sheets of standard paper.

**PART 3 EXECUTION**

**3.1. INSTALLATION**

A. The pneumatic tube system and components shall be assembled and installed in strict accordance with contract documents, applicable codes and regulations, approved shop drawings, and Manufacturer's recommendations.

B. The System and components shall be anchored and fastened to building construction as required for a stable, secure installation. All exposed parts of the system and finish components shall be closely fit and joined to provide a neat uniform appearance.

**3.2. SYSTEM TESTING AND ACCEPTANCE**

A. Prior to a formal System performance test, the manufacturer shall perform preliminary tests, verifying all components are in fully operational condition for carrier dispatch and receive between all possible station combinations.

B. Provide written notification to VA COR thirty (30) days in advance of the scheduled System performance test. The manufacturer shall provide all personnel, equipment and instruments required for such an examination.

C. Perform all operational tests, inspect PTS components and verify of equipment installation and operating is in proper condition, in accordance with the construction documents in the presence of the VA COR.

**3.3. OWNER TRAINING**

A. Provide Owner training as outlined in Specification Section 01 91 00 – General Commissioning.

END OF SECTION 14 92 00